

Sep 28 05 12:51P AKTUSER

408-563-4409

P. 2

PATENT  
Atty. Okt. No. APPM/4215Y1/CMP/CMP/RK

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:  
Sun et al.

Serial No.: 09/645,690

§§ Group Art Unit: 1746

Filed: August 24, 2000

§§ Examiner: Alexander Markoff

For: CU CMP POLISHING PAD  
CLEANING

§§ Confirmation No.: 4428

MAIL STOP: AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING  
37 CFR 1.8

I hereby certify that this correspondence is being deposited on <u>12/21/05</u> with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
<u>12/21/05</u>
_____ Signature
Date

DECLARATION UNDER 37 C.F.R. § 1.131

The undersigned inventor, Lizhong Sun, hereby declare as follows:

1. That I am a co-inventor of the above referenced patent application.
2. Attached is an invention alert (Exhibit A) dated prior to August 7, 2000, disclosing improvement of cleaning a CMP polishing pad by using a pad cleaning composition. All masked dates in Exhibit A are prior to August 7, 2000. Confidential information not relevant to the invention date of the present application is also masked.
3. That Exhibit A describes a method for cleaning a polishing pad surface subsequent to CMP a wafer surface containing copper or a copper-based alloy using a pad cleaning composition and the method was conceived prior to August 7, 2000.
4. In view of Exhibit A and the above statements, the invention of pending claims 1-18, 26-31 and 33 was conceived prior to August 7, 2000, and filed with due diligence prior to August 7, 2000, to the filing of the patent application on August 24, 2000.

~6388100.DOC

09/28/2005 WED 12:52 (TX/RX NO 5905) 002

Sep 28 05 12:52p AKTUSER

408-563-4409

P.3

PATENT  
Atty. Dkt. No. APPM/4215Y1/CMP/CMP/IRKK

5. The undersigned, Lizhong Sun, hereby declares that all statements made herein of my own knowledge are true and that these statements made on information and belief are believed to be true and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent resulting therefrom.

09/27/05

Date

Lizhong Sun

-6388100.DOC

09/28/2005 WED 12:52 [TX/RX NO 59051] 003

INVENTION ALERT FORM**0004215**

TO: Gaile Bailey MS 2061  
 Extension: 32724  
 Current Date: 7/9

ALERT NO: 4111:22**CIRCLE ONLY ONE FROM EACH TOP SECTION:****1) OWNER 2) DIVISION 3) PRODUCT BUSINESS GROUP(PBG)**

PLEASE SUBMIT ONE ORIGINAL, SIGNED DOCUMENT FOR RECORDING. IF THIS IS A COPY  
 OF A PREVIOUSLY SUBMITTED ALERT, PLEASE MARK IT ACCORDINGLY

EPI	KPUI	METAL	ATD	IBSS	CORE TEC	PRP	COPPER	ACVD	OPAL	AMIL
ORION	KPU3	SILICON	CORP		MICRO		PLUG	APVD	ORBOT	
OXDL	KPU8	HDP			CORE ENG		LINER/ BARRIER	AETCH	NPD	
AIT	PSI	MXP&RPS			PROCOMP		BASELINE	AHRDW	ITC	
CAP	CMP	COM ENG			CORE KNO		ECD/CU			
	LOWK	HEXODE								
	HIGH K	SMO								

Please use separate attachments for any answers that don't fit on the form, especially for questions 3-8. If the answer to a question is "NONE", please write "NONE" rather than leaving the answer blank.

1. Title of Invention (please print clearly):

A PAD CLEANING SOLUTION FOR METAL CMP

2. Inventors-Names only-(please print clearly and provide complete information at Section 5.)

Lizhong Sun, Shijian Li, and Fritz Redeker

3. Earliest dates and model names of all Applied products incorporating the invention which have been offered for sale or are expected to be offered for sale:

Commonly, slurries or fixed abrasive solutions in metal CMP consists of complexing agents and inhibitors. During polishing, these components react with removed metal and form some polish bi-products, which deposit onto polish pads and accumulate colored stain or glazed area. This can significantly affect a polish removal rate, result in unstable processes, and cause scratches on wafer surface. Usually, pad conditioning with Nylon brushes or diamond disks is used for removing the deposited bi-products from pads. However, this kind of conditioning can not completely remove the deposition. With increasing polishing time, the deposition still accumulates. Therefore, the conditioning with brushes and diamond or ceramic disks can just partially clean the pad. In this work, an efficient pad cleaning solution

for metal CMP was invented, which is able to efficiently remove the bi-product from polish pads and keep the pad clean.

4. If the invention has been demonstrated or described to persons other than Applied employees, for each disclosure please provide the earliest date, name of company, a brief description of what was disclosed and the purpose of the disclosure. Attach a copy of any related non-disclosure agreements:

None

---

---

---

---

---

---

5. If future disclosures like those in Question #4 are expected to occur within the next 12 months, please provide the anticipated date, type of information to be disclosed, and purpose of the disclosure: NONE [  ]

---

---

---

---

---

---

6. Describe any other known designs or processes, whether actually implemented or merely proposed in a publication, which could be considered similar to your invention or which constitute the state-of-the-art improved upon by your invention. If described in a publication, attach a copy of the same or provide a citation.

Unkown

---

---

---

---

---

---

7. List each feature of the invention, which you consider novel and non-obvious. Describe the advantages of each novel feature in comparison with the state-of-the-art approaches, which are most similar to your invention:

Pad-glazing problem due to the deposition of polish bi-products on polish pads causes a low removal rate, an unstable process, and scratches on wafer surface. Conventional conditioning methods (brush and diamond or ceramics disks) can only partially remove them from pads. In this invention, a chemical solution was applied onto a rotating polish pad with a flowrate of \_\_\_\_\_ ml/min for \_\_\_\_\_ after each wafer was polished. Then, high-pressure DI water was spread on the pad for \_\_\_\_\_ to clean the solution. The pad kept as clean as a new pad throughout its lifetime.

8. Describe the invention, preferably with reference to attached drawings:

In this work, a pad cleaning solution for copper CMP was invented. The solution contains following components:

- a. An organic compound with amine or amide group(s), such as \_\_\_\_\_ with concentration from \_\_\_\_\_ %;
- b. An acid, such as phosphoric acid, acetic acid, and sulfuric acid to adjust pH of the solution to a range from \_\_\_\_\_
- c. DI water for the rest.

ATTACH ADDITIONAL SHEETS TO DESCRIBE INVENTION AS NEEDED

## 9. Provide the following information for EACH inventor:

**Inventor #1:**

Name:	Lizhong Sun	Employee #	77745	Mail Stop	1512
Work Phone	408-235-6538	Fax No.:	408-563-5430		
Job Title:	Member of Technical Staff				
Citizenship	P. R. of China				
Home Address	575 E. Remington Drive, #22C, Sunnyvale, CA 94087				
Manager:	Shijian Li	Title: Manager, Advanced Technology			
Div. Manager	Fritz Redeker	Title: Senior Director of Technology			
Product Group:	CMP	Dept #: 2893			

**Inventor #1:**

Name:	Shijian Li	Employee #	10044	Mail Stop	1512
Work Phone	408-986-2609	Fax No.:	408-563-6829		
Job Title:	Senior Member of Technical Staff / Leader of Advanced Technology				
Citizenship	P. R. of China				
Home Address	1202 Donington Dr., San Jose, CA 95129				
Manager:	Fritz Redeker	Title: Senior Director of Technology			
Div. Manager	Chris Smith / John White	Title: General Manager			
Product Group:	CMP	Dept #: 2893			

**Inventor #4:**

Name:	Fritz Redeker	Employee #	76021	Mail Stop	1512
Work Phone	408-748-5805	Fax No.:	408-563-5430		
Job Title:	Senior Director of CMP Technology				
Citizenship:	U.S.A.				
Home Address:	1801 Sionx Dr. Fremont				
Manager:	Chris Smith / John White	Title: General Manager			
Div. Manager:	Tom St. Dennis	Title: President PDD			
Product Group:	PDD	Dept #: 1399			

**FOR ADDITIONAL INVENTORS, PLEASE COMPLETE AND ATTACH ADDITIONAL SHEET AS NEEDED.**